3   photosensitive substrate, comprising a catadioptric optical

4   system according to Claim 29 which projects a predetermined

5   pattern on a mask onto a photosensitive substrate.

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1   62.(Amended)   A projection exposure apparatus which

2   projects a predetermined pattern on a mask onto a

3   photosensitive substrate, comprising a catadioptric optical

4   system according to Claim 51 which projects a predetermined

5   pattern on a mask onto a photosensitive substrate.

Please add the following new claims:

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1   63.(New)   A projection exposure method comprising:

2   preparing a catadioptric optical system according to

3   Claim 18; and

4   projecting an image of a predetermined pattern on a mask

5   onto a photosensitive substrate using the catadioptric

6   optical system.

1   64.(New)   A projection exposure method comprising:

2   preparing a catadioptric optical system according to

3   Claim 29; and

4   projecting an image of a predetermined pattern on a mask

5   onto a photosensitive substrate using the catadioptric

6   optical system.

1   65.(New) A projection exposure apparatus which projects

2   a predetermined pattern on a mask onto a photosensitive

3   substrate, comprising a catadioptric optical system according

4   to Claim 30 which projects a predetermined pattern on a mask

5   onto a photosensitive substrate.

1   66.(New) A projection exposure method comprising:

2   preparing a catadioptric optical system according to

3   Claim 30; and

4   projecting an image of a predetermined pattern on a mask

5   onto a photosensitive substrate using the catadioptric

6   optical system.

1   67.(New) A projection exposure apparatus which projects

2   a predetermined pattern on a mask onto a photosensitive

3   substrate, comprising a catadioptric optical system according

4   to Claim 31 which projects a predetermined pattern on a mask

5   onto a photosensitive substrate.

1   68.(New)   A projection exposure method comprising:

2   preparing a catadioptric optical system according to

3   Claim 31; and

4   projecting an image of a predetermined pattern on a mask

5   onto a photosensitive substrate using the catadioptric

6   optical system.

1   69.(New)   A projection exposure apparatus which projects

2   a predetermined pattern on a mask onto a photosensitive

3   substrate, comprising a catadioptric optical system according

4   to Claim 33 which projects a predetermined pattern on a mask

5   onto a photosensitive substrate.

1   70.(New)   A projection exposure method comprising:

2   preparing a catadioptric optical system according to

3   Claim 33; and

4   projecting an image of a predetermined pattern on a mask

5   onto a photosensitive substrate using the catadioptric

6   optical system.

1   71.(New)   A projection exposure apparatus which projects

2   a predetermined pattern on a mask onto a photosensitive

3   substrate, comprising a catadioptric optical system according

4   to Claim 34 which projects a predetermined pattern on a mask

5   onto a photosensitive substrate.

1   72.(New) A projection exposure method comprising:

2   preparing a catadioptric optical system according to

3   Claim 34; and

4   projecting an image of a predetermined pattern on a mask

5   onto a photosensitive substrate using the catadioptric

6   optical system.

1   73.(New) A projection exposure apparatus which projects

2   a predetermined pattern on a mask onto a photosensitive

3   substrate, comprising a catadioptric optical system according

4   to Claim 35 which projects a predetermined pattern on a mask

5   onto a photosensitive substrate.

1   74.(New) A projection exposure method comprising:

2   preparing a catadioptric optical system according to

3   Claim 35; and

4   projecting an image of a predetermined pattern on a mask

5   onto a photosensitive substrate using the catadioptric

6   optical system.

5

1   75.(New) A catadioptric optical system according to

2   Claim 51, wherein the catadioptric optical system has both-

3   side telecentricity.

1   76.(New) A projection exposure apparatus which projects

2   a predetermined pattern on a mask onto a photosensitive

3   substrate, comprising a catadioptric optical system according

4   to Claim 75 which projects a predetermined pattern on a mask

5   onto a photosensitive substrate.

1   77.(New) A projection exposure method comprising:

2   preparing a catadioptric optical system according to

3   Claim 75; and

4   projecting an image of a predetermined pattern on a mask

5   onto a photosensitive substrate using the catadioptric

6   optical system.

1   78.(New) A projection exposure apparatus which projects

2   a predetermined pattern on a mask onto a photosensitive

3   substrate, comprising a catadioptric optical system according

4   to Claim 37 which projects a predetermined pattern on a mask

5   onto a photosensitive substrate.

6

1   79.(New) A projection exposure method comprising:

2   preparing a catadioptric optical system according to

3 Claim 37; and

4   projecting an image of a predetermined pattern on a mask

5 onto a photosensitive substrate using the catadioptric

6 optical system.

1   80.(New) A catadioptric optical system according to

2 Claim 38, wherein the catadioptric type optical system

3 includes a lens group having at least one positive lens, and

4 the refraction type optical system includes an aperture

5 diaphragm.

1   81.(New) A catadioptric optical system according to

2 Claim 38, wherein the catadioptric type optical system

3 includes a lens group having at least one lens element whose

4 surface is aspherical, and the refraction type optical system

5 includes at least one lens element whose surface is

6 aspherical.

1   82.(New) A projection exposure apparatus which projects

2 a predetermined pattern on a mask onto a photosensitive

3 substrate, comprising a catadioptric optical system according

7

4   to Claim 38 which projects a predetermined pattern on a mask

5   onto a photosensitive substrate.

1   83.(New) A projection exposure method comprising:

2   preparing a catadioptric optical system according to

3   Claim 38; and

4   projecting an image of a predetermined pattern on a mask

5   onto a photosensitive substrate using the catadioptric

6   optical system.

1   84.(New) A projection exposure method comprising:

2   preparing a catadioptric optical system according to

3   Claim 51; and

4   projecting an image of a predetermined pattern on a mask

5   onto a photosensitive substrate using the catadioptric

6   optical system.

1   85.(New) A reduction projection catadioptric optical

2   system for projection exposure, comprising:

3   at least one lens element and at least one mirror,

4   wherein all mirrors among the at least one mirror are

5   devoid of planar folding mirrors,

6   the reduction projection catadioptric optical system

7 further comprising an aperture diaphragm on an image side of

8 a most image-wise curved mirror.

1   86.(New) A reduction projection catadioptric optical

2 system according to Claim 85, wherein the reduction

3 projection catadioptric optical system has a numerical

4 aperture of 0.6 or more.

1   87.(New) A reduction projection catadioptric optical

2 system according to Claim 85, wherein there is a straight

3 axis of symmetry of all curvatures of all optical elements.

1   88.(New) A reduction projection catadioptric optical

2 system according to Claim 85, wherein the reduction

3 projection catadioptric optical system forms an intermediate

4 image, and wherein at least two mirrors are arranged upstream

5 of the intermediate image in an optical path.

1   89.(New) A reduction projection catadioptric optical

2 system according to Claim 85, further comprising a lens group

3 next to an object plane, wherein the reduction projection

4 catadioptric optical system has object-side telecentricity.